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The Importance of Ongoing ERP Training and Support

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Abstract

This paper formulates and tests a model of the factors influencing organisational capacity to use an ERP system effectively in the years after go-live. Three large organisations' post-implementation studies into end-user training were used as preliminary validation of this model; and to highlight the proposition that users' ERP knowledge and skills will degrade in the absence of a systematic approach to ongoing training and support. The analysis also found that the negative effects of staff attrition and turnover offset the positive initiatives to enhance end-user competence in the most proactive organisation studied.

Keywords

End-user training, ongoing training, continuous training, support, documentation, enterprise systems, ES, ERP.

INTRODUCTION

ERP systems are constantly evolving as organisations seek to optimise business processes, integrate with non ERP systems, and enhance the decision-making capabilities of the software (Davenport, Harris & Cantrell 2002, 2004). As ERP systems become more complex, the need for support for the human users of the system increases (D'Cruz & Rivest 2004). At the same time, unaddressed attrition rates, new employees and employees changing roles places a further burden on organisational capacity to gain value from the ERP investment (MetaGroup 2003; Begley & Rivest 2002). According to the Australian Bureau of Statistics (2004) the average annual staff turnover rate is 14% per annum. An evolving ERP system coupled with employee movement and turnover necessitates ongoing ERP training and support. Without this ongoing training and support, user competency will degrade and organisational return on investment targets will be difficult to attain (Meta Group 2003).

To facilitate development of skilled people, each ERP-using organisation must invest in training. The critical role served by training in successful ERP implementations is well documented (Gallivan, Spitler & Koufaris 2005; Duplaga & Astani 2003; Nah, Zuckweiler & Lau 2003; Robey, Ross & Boudreau 2003). There have been several problems, however, in the practical application of training in organisations (Gallivan et al. 2005). For examples, training is often under-budgeted for (Slater 1998) and is often the first expense to be cut when organisations reign in spending due to economic downturns or increased competition (Gallivan et al. 2005); training is often sacrificed when implementation schedule overruns occur (Gallivan et al. 2005); and ERP support groups are vastly underserved with respect to continuous training and performance monitoring (MetaGroup 2003).

Training may be classified as either formal or informal. Formal ERP training methods include classroom based, one-to-one instruction, online learning, formal networks of knowledgeable users, collaborative learning, teleconferencing and video-conferencing. Informal training may take the form of casual questioning of more knowledgeable users and spontaneous demonstrations of the application (Boudreau 2003). SAP recommends a 'blended' approach to training through a combination of classroom based, e-learning, teleconferencing (D'Cruz & Rivest 2004); and support from 'super' users who are specially trained users designated to provide support to others in their work groups.

Virtually all ERP training related research is focussed on addressing end-user training needs immediately prior to go-live and on project team training at the inception of the project (Boudreau 2003 is a notable exception). The importance of ongoing ERP training and support post go-live has not been widely addressed in the academic

arena. There are, however, a few white papers and articles concerning continuous or periodic refresher ERP training published in the practitioner press (see for examples MetaGroup 2003; D'Cruz & Rivest 2004). Jaspersen, Carter and Zmud (2005) in a review of IS post-adoption behaviour research, strongly encouraged scholars to develop rich conceptualisations of post-adoptive training strategies. To this end, the research question addressed in this study is:

What factors affect individual and organisational capacity to use an ERP effectively, post go-live?

In answering this question, the objective of this paper is to demonstrate the importance of ongoing ERP training and support in the years after an organisation 'goes live' with an ERP system.

A MODEL OF ORGANISATIONAL CAPACITY TO USE AN ERP SYSTEM

In this section, we develop a model of an organisation's capacity to use an ERP system effectively post go-live. The model consists of two parts. The first part is a model of factors affecting an *individual* ERP-system user's capacity to use the relevant part of the ERP system for their role. The second part of the model focuses on the organisation. In this second part, organisational capacity is viewed as the interacting sum of the individual users' capabilities to use the ERP effectively post go-live.

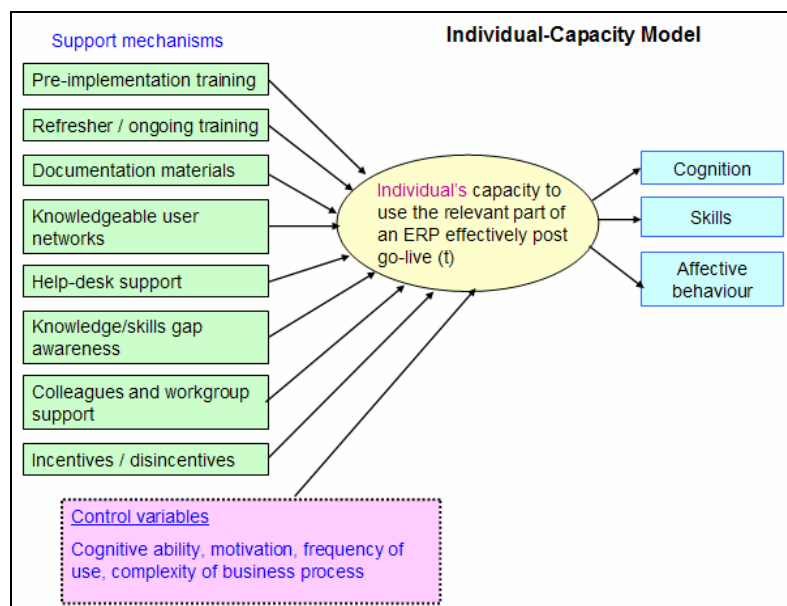


Figure 1: The Individual-capacity model of factors affecting ERP use post go-live

Individual-Capacity Model

Figure 1 presents a model of eight factors and four control variables that are hypothesized to influence individual's capacity to use the relevant part of an ERP effectively post go-live. The dependent variable in Figure 1, an individual's capacity to use an ERP system effectively, is conceptualised as being measured by three variables: the individual's cognition, skills, and affective behaviours. These three variables are based on Kraiger, Ford and Salas' (1993) taxonomy of learning outcomes, which is simpler than the six-factor model of Sein, Bostrom and Olfman (1999). Cognitive outcomes include user knowledge and cognitive strategies for problem solving. In relation to ERP systems, cognitive outcomes refers to knowledge about business processes, how these are connected to other business processes, as well as the overall big picture of what an ERP system is and how it benefits the organisation. This knowledge helps the user to transfer learning to new situations (Gupta & Bostrom 2006). Skill-based outcomes focus on the user's ability to use the ERP to complete tasks or business processes. Affective outcomes refer to user's attitude to the system, satisfaction with training, perceived usefulness of the application, motivation to use the ERP effectively, perceived anxiety in engaging with the ERP, etc. (Gupta & Bostrom 2006). Finally, an individual's capacity to use an ERP effectively is conceptualised as varying over time. This is indicated by the "(t)" notation in Figure 1, where "t" stands for time.

The independent variables in the Individual-capacity model in Figure 1 are now discussed in turn.

Pre-implementation training

The quality of *pre-implementation training* has an impact of individual's capacity to use the system long after go-live. Boudreau (2003) found that users who had not learned the ERP system well during initial training, still struggled to use the system effectively some 15 months after go-live. Likewise, Scott (2005) found that the

relatively small ERP training budget hampered efforts to prepare more than 2,000 end-users, and problems persisted two years after training. Therefore, it is hypothesized in Figure 1 that the lower the quality or extent of pre-implementation training, the greater the need for refresher or ongoing training and support post go-live (Clark, Jones & Zmud 2006).

Refresher/ongoing training

Refresher and/or ongoing training is important to enhance existing user's capacity to use the system, as well as to initiate new users and users changing roles within the organisation. Refresher training refers to ramping-up trained users' knowledge to allow them to better understand the system and to employ advanced features of the software. Most pre-implementation training is focussed on functional use of the software, rather than on how or why business processes have changed (Jones, 2001). Refresher training is therefore necessary to educate end-users about the broader concepts of ERP systems and about business processes (Clark et al. 2006). Continuous training refers to offering ongoing training, whether classroom based or online. Some form of continuous training is important to cater for new employees and employees changing roles within the organisation. Markus and Tanis (2000) noted that a common ERP problem was the failure to provide for the growth in end-user skills. Meta-Group (2003) recommend continuous training, however they stipulate that at the barest minimum, organisations should offer refresher training at crucial evolutionary periods of the ERP lifecycle.

Documentation materials

Apart from instructor-led and online training, online or offline *documentation materials* also assist in enhancing users' existing capacity to use, or building novice users' capacity to use. Scott (2005) conducted an analysis of the post-implementation usability of ERP manuals and indicated that an organisation should not neglect the usability of their documentation post go-live. The poorer the documentation, the more likely users will waste time correcting errors, interrupting colleagues for help, or making a distress call to the help desk (Scott 2005). The most valued characteristic of documentation was the ability to provide task support (Scott 2005). Scott's (2005) suggestions for improved documentation include incorporating FAQs, improving the search engine, incorporating hyperlinks, soliciting feedback, and keeping the materials up-to-date.

Knowledgeable user networks

Fostering *knowledgeable users* and establishing communities of practice are an important source of learning for end-users. For example, the SAP Director of Education (Australia/New Zealand), Edmund D'Cruz, says that access to peers and communities of practice are important means for users to upgrade knowledge and to find solutions to problems (D'Cruz & Rivest 2004). In the research literature, there are a number of examples of how organisations such as Motorola and Texas Instruments utilised 'super-users' to assist with ERP training and ongoing support (see for examples Roberts, Jarvenpaa & Baxley, 2003; Brown & Vessey, 2003; Sarkis & Sundaraj 2003). Super-users are users who typically have received advanced ERP training and are considered knowledgeable within their business process domain. Other names for super-users are power-users, process champions and subject matter experts. Some organisations struggle to overcome ERP knowledge barriers because they discontinue super-user support post go-live (Robey et al. 2002). An example of the use of communities of practice is outlined in a case study of Texas Instrument's world-wide ERP implementation (Sarkis & Sundaraj 2003). Texas Instruments established web-based support groups to help resolve user problems.

Help desk

The *help desk* is another enabler of effective ERP use. Ng, Gable and Chan (2002) found that requests for ERP user-support constituted a major part of ERP maintenance activity. Most help desk requests occur just after go-live, then spikes in activity occur as the system is upgraded or new ERP functionality is incorporated (Ng et al. 2002). In the early days post go-live, most help desk requests relate to logging in to the system, or basic navigation problems. As users gain more experience with the system, the requests tend to become more complex, albeit less frequent. Motorola was able to cater for the peaks and troughs in their ERP Command Centre by negotiating agreed post go-live workloads (Roberts et al. 2003). Help desk statistics are an indicator as to how users are coping with the system (MetaGroup 2003). When the Canadian Broadcasting Corporation provided refresher training, approximately four years after their ERP implementation, calls to the help desk reduced (Begley & Rivest 2004). On the other hand, if calls to the help desk are not handled expediently by experienced ERP staff, end-users soon lose confidence in this source of support. For example, Boudreau (2003) found that many users were disgruntled with help desk staff's ability to handle their queries in a timely manner, preferring to ask a colleague rather than wait several days for a response.

Knowledge/skills awareness gap

Knowledge/skills awareness gap refers to individuals being made aware that they are not using the system as effectively as possible. This is necessary because some users may use technology in ways not anticipated *a priori* (Tyre & Orlikowski 1994; Robey et al. 2002). For example, Jaspersen et al. (2005) noted that most IT users apply only a narrow band of features, and that organisations might achieve considerable economic benefits if they could encourage and enable users to enrich their use of IT systems. This could entail continuous end-user

monitoring (MetaGroup 2003) and encouragement to undergo training for those users identified as having deficient knowledge and skills. For the more efficient users, continuous communication of 'tips and tricks' and advanced features of the software will help deepen knowledge and skills.

Colleagues and workgroup support

Jasperson et al. (2005) criticised training practitioners and researchers for focusing on skill acquisition and transfer at the individual level, rather than considering the broader sharing of skills, knowledge and attitudes at the group level. They suggested that the interaction of group members has a profound effect in both formal training settings and in informal contexts (see also George, Iacono & Kling 1995; Galletta et al. 1995). The use of colleagues as resident experts or informal consultants has also been highlighted in IS research (Marcolin, Compeau & Ross 2004; Boudreau 2003; Lee 1986). Boudreau (2003) found that staff often asked colleagues for help rather than approach the help desk or locate documentation materials. Furthermore, colleagues may be a source of learning or an inspiration for learning. For example, Boudreau (2003) noted that peer pressure was one of the main factors that motivated some users to seek informal training.

Incentives/disincentives

In terms of *incentives/disincentives*, employees must be motivated to (a) participate in initial and ongoing training, (b) explore the advanced features of the ERP, and (c) use the system effectively. The use of an ERP system is often mandatory, however, an individual's exploration and application of advanced features is non-mandatory (Jasperson et al. 2005). Jasperson et al. (2005) found that post-adoptive use of IT may decrease over time as various features of the application are resisted, treated with indifference, or used in a limited fashion. For example, Ross and Vitale (2000) noted that one of the most difficult forms of ERP resistance is 'intellectual resistance' while Robey et al. (2002) documented how some organisations overcame knowledge barriers by offering incentives to use the system accurately. Many users are reluctant to be creative and take risks, therefore top management must cultivate an environment conducive to change (Paper & Chang 2005). Over time, once new business processes have become established and stabilised, they become routine and embedded within the organisation (Newell et al. 2003); thus inhibiting change and the desire to learn more about the ERP system. Consequently, some form of incentives/disincentives are required to encourage users to attend to their ERP learning and to use the system appropriately. Incentives may be intrinsic (increase in image/identity, self-satisfaction) or extrinsic (praise, rewards, formal accreditation, job promotion, etc.). A disincentive, on the other hand, may be to deny ERP access unless the end-user demonstrates that he or she has completed training and/or acquired sufficient ERP competence.

Control variables

The control variables in Figure 1 are cognitive ability, training motivation, frequency of use, and complexity of the business process. These variables have been shown in prior research to affect either learning outcomes (see for examples Salas & Cannon-Bowers 2001; Colquitt, LePine & Noe 2000; Tannenbaum & Yukl 1992; Ford, Quinones, Sego et al. 1992) or IS use (Martocchio & Webster 1992; Carle & Julian 2001; Clark et al. 2006).

Organisational-Capacity Model

The second half of the Organisational-capacity model is shown in Figure 2. Here, the dependent variable is the Organisation's capacity to use its ERP system effectively, which is again shown as varying over time (t). Independent variables are now discussed in turn.

The weighted sum of individual capacities

In Figure 2, the link between individual's capacity and the organisation's capacity to use the ERP effectively post go-live is conceptualised. At this stage in our development of the model, it is not clear how individual users' capacities should be aggregated. It is clear, however, that (a) different individuals will have different levels of knowledge, skills and attitudes toward the application, (b) different jobs will require different knowledge and skills, and (c) different users use the system for vastly different hours per month. In assessing organisational capacity, we posit that more weight should be given to those who use the system most and those in the most important roles.

Staff turnover, resources devoted to training, quality of support, and frequency of system upgrades

Figure 2 shows four factors that are hypothesized to affect an organisation's capacity to use an ERP system effectively. First, staff turnover through attrition, new hires and employees changing roles is hypothesized to have a negative impact on organisational capacity (MetaGroup 2003; D'Cruz & Rivest 2004). Second, it is important that management dedicates ongoing resources to enable the organisation to achieve value from its ERP investment (Davenport, Harris & Cantrell 2004; Harris & Davenport 2006). Third, while ongoing resources may help mitigate the impact of staffing and system changes, such resources will not necessarily solve the problem if their quality is low. Increasing the amount of training, for example, does not necessarily lead to improved use of the system (Gallivan et al. 2005); or reams of documentation is of little value if users cannot navigate through successfully (Scott 2005). Therefore, a dimension that represents the *quality* of training and support is integral to

the organisational capacity model. Finally, it is hypothesized that system upgrades, enhancements and business process changes also have a negative impact on organisational capacity to use an ERP system effectively (Meta Group 2003; D'Cruz & Rivest 2004).

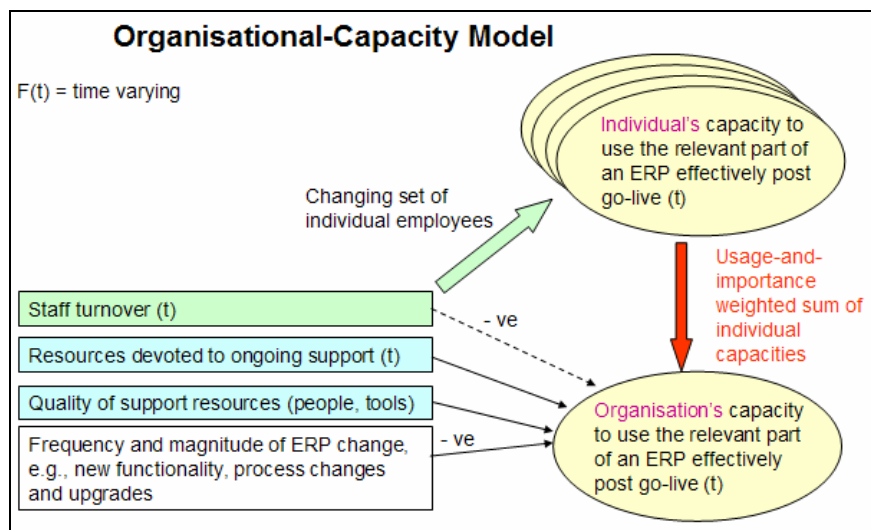


Figure 2: The Organisational-capacity model of factors affecting ERP use post go-live

METHOD

End-user survey results were obtained from three large organisations who all used SAP's R/3 software. The authors were not involved in the development and administration of any of the surveys. Personal interviews were conducted, however, with senior staff responsible for training/change management in each of the three organisations. In this report, the organisations are titled UniCo, UtilityCo and ManuCo to maintain anonymity of UtilityCo and ManuCo. UniCo is Monash University, Australia, whose end-user survey results are available on the world wide web (Carle & Julian 2001). UtilityCo provided the authors with the raw data from their survey, while UniCo and ManuCo provided only their completed reports. Each organisation's objective for administering their survey was different, so the surveys are not directly comparable. Nonetheless, the data from the three surveys provide a useful source of data for a preliminary test of the model in Figures 1 and 2. The data are also useful for testing whether organisational ERP knowledge and skills degrade over time in the absence of ongoing training and support. Table 1 highlights the sample size, response rate, and the months elapsed between go-live and the survey date for each of the three surveys.

	UniCo	UtilityCo	ManuCo
Survey date	May 2000	Jul 2005	Dec 2004
Sample size	1478	798	115
Responses	530	308	101
Response rate	36%	39%	88%
Months post go-live/upgrade	10	16	72+

Table 1: Overview of survey and response rate

UniCo employs about 5,500 staff in multiple locations across Victoria. In 1999, UniCo rolled out SAP R/3 Financial Accounting and Human Resources modules as part of a new integrated administrative system (IAS). In May 2000, ten months after go-live, UniCo conducted a survey of all SAP users. The focus of the end-user survey was on user perceptions of the benefits and weaknesses of SAP, however, a number of training related responses were elicited. The then IAS Project Director was interviewed in July 2006 to provide further clarification.

UtilityCo is an Australian based company with offices in every Australian State and Territory. UtilityCo has approximately 3,000 employees and contractors. UtilityCo implemented SAP v3.1H (Financial Accounting, Controlling, Logistics and HR components) in 1998 and upgraded to SAP v4.6C in 2004. Prior to the upgrade, UtilityCo embarked on a project to update end-users' SAP skills and to train new users on the system. This project was aptly titled 'SAP Refresh.' Upon completion of the SAP Refresh Project in 2004, UtilityCo identified that approximately one-fifth of end-users had 'below average' SAP knowledge and skills, and concluded that these users required additional training to help them "get the best from SAP". UtilityCo therefore implemented a twelve-month *SAP Learning Development Plan* for the period July 2004 to June 2005. This plan was comprehensively evaluated in July 2005. The evaluation involved two separate surveys - one for users who had

attended formal classroom-based training, and the other for users who had not attended classroom-based training in the prior 12 months. In terms of the classroom-trained users, 510 surveys were distributed resulting in a response rate of 39%. With respect to non-classroom-trained users, 288 surveys were distributed and a response rate of 38% was achieved. The SAP Training and Change Management Manager was interviewed in September 2005 and July 2006. Apart from the two end-user surveys, UtilityCo also provided the authors with the company's SAP Learning and Development Plan.

ManuCo is a multinational manufacturing company. In Australia and New Zealand, ManuCo employs more than 2,500 people. ManuCo implemented SAP R/3 Financial Accounting (FI), Controlling (CO) and Logistics (LO) during 1997/1998. Since then, the company has continually upgraded functionality. For example, in 2004 Profitability Analysis in CO was implemented; and in 2005 the company incorporated Just-in-Sequence processing and Service Quality Management (SQM). Since implementation of FI, CO and LO six years earlier, the company had not offered any refresher training to employees, resulting in only one-third of SAP users having had any systematic SAP training. ManuCo, however, had provided formal pre-implementation training when new modules such as SQM were implemented. The IT Manager identified a need to develop a sound business case for SAP training. In late 2004, he conducted an evaluation of end-users' training needs under the auspices of a Six Sigma project. A survey was sent to 115 SAP users with a response rate of 88%. In June 2005, the IT training manager was interviewed to discuss the findings of this project.

FINDINGS

The approach adopted for testing the models presented in Figures 1 and 2 above was to examine each of the three company's end-user surveys looking for evidence that supported or refuted the hypothesized relationships. Below, we report findings from the reports as they relate to each of the hypothesized factors.

Individual-Capacity Model (Figure 1)

Pre-implementation training

The evidence suggests that pre-implementation training is an important determinant of individual capacity to use an ERP system post go-live. This conclusion is based on the UniCo's finding that only ten months after implementation, two-thirds of respondents felt they needed more SAP training for themselves or for their staff. One reason for this was that the pre-implementation training was not prioritised for those users who needed to engage with the system frequently. Prior to go-live, UniCo's training budget was stretched to the limit, consequently, many people missed out on higher-level, more in-depth courses. Post-implementation training was therefore required to rectify the training allocation problem, as well as to cater for the changing end-user base.

Refresher/ongoing training

The evidence suggests that refresher training is also an important determinant of individual capacity to use an ERP system post go-live. At ManuCo, staff attrition resulted in a situation where six years after go-live, only one-third of SAP users had undertaken any systematic SAP training, less than twenty percent of SAP users felt that they were adequately trained in SAP, and one-quarter of ManuCo's SAP users had less than one year's experience with SAP. UtilityCo, on the other hand, were quite proactive in providing refresher training and ongoing training to their SAP end-user base. Despite this, only 16 months after go-live, many users believed they required more training. For example, just over one-third (37%) of the classroom-trained users indicated that they needed further training and/or assistance. Similar results were found for UtilityCo's non-classroom-trained users (40%). UniCo's survey also highlighted a desire for more training, insofar that two-thirds of respondents (67%) indicated that more training would help them, or their staff, make better use of SAP.

Documentation materials

The evidence suggests that documentation is an important determinant of individual capacity to use an ERP system effectively post go-live. ManuCo had not maintained training or documentation materials since implementation, resulting in only 5% of users knowing that there were some documentation materials available. In stark contrast to ManuCo is UtilityCo's endeavour to maintain up-to-date documentation materials. UtilityCo established an SAP Learning Centre as a central repository for SAP user documentation. The SAP Learning Centre housed Quick Reference Cards (QRCs), user guides, PowerPoint presentations and other miscellaneous material. Centre services were revamped to include online booking, an enhanced news service and role-based curricula. About eighty-percent of UtilityCo's SAP users had used the Learning Centre, and this use was greater for the classroom-trained users (85%) than for the non-classroom-trained users (68%). Half of the non-classroom-trained users indicated that they were not aware of the SAP Learning Centre and the materials within it, while 77% of the classroom-trained users said they were aware. The non-classroom-trained users, however, were principally new employees who probably were not yet aware of all the services available to them.

Quality documentation materials can help fill the void left by classroom-based training. For example, Unico indicated that different training materials were required for the infrequent users who often forgot what they had

learned during training and in between ERP use. UniCo suggested providing web-based, self-help modules for the 'infrequent-user' group.

Knowledgeable user networks

The evidence suggests that knowledgeable user networks are also an important determinant of individual capacity to use an ERP system post go-live. UtilityCo and UniCo detailed strategies about promoting knowledgeable user networks within their organisations. For example, UtilityCo had nominated 'SAP Process Champions' who helped to oversee the training process within their area and to conduct training; and 'SAP Process Representatives' who helped to influence the uptake of training, disseminate key information and to provide informal assistance to end-users. There was also an SAP Network that provided informal support to SAP users, particularly to new users. This network also shared hot-tips and information updates, and helped users to register outstanding issues with the IT help desk.

Help desk

There was some limited evidence that help desks are a determinant of individual capacity to use an ERP system effectively post go-live. Just over half (51%) of UtilityCo's SAP users required help either occasionally (43%) or every time (8%) they used the application. As expected, more of the non-classroom-trained users required help either occasionally or every time (66%) than the classroom-trained users (44%). When requiring help, however, only 8% called the help desk. A greater proportion of non-classroom-trained users approached the help desk (12% compared to 6%). As mentioned, calls to the help desk vary over the ERP lifecycle, therefore these statistics must be viewed in light of that lifecycle. Arguably, UtilityCo's SAP upgrade had stabilised and therefore calls to the help desk had bottomed-out. Moreover, use of the help desk is also a function of the quality of documentation materials and the availability of knowledgeable user networks and peers. The greater this quality, the less need to rely upon the help desk for support.

Knowledge/skills awareness gap

The evidence suggests that identifying gaps in end-users' knowledge and skills are an important mechanism for developing programs to improve individual capacity to use an ERP system effectively post go-live. All three companies attempted to identify end-user knowledge/skills gap via the surveys and to undertake measures to bridge this gap. For example, ManuCo determined that more than 50% of users wanted to be trained in reporting functionality; while UniCo indicated that staff required practical assistance [training] in developing reports. UtilityCo regularly analysed help desk requests to determine future training needs and used the SAP Network to disseminate information regarding 'tips and tricks' and advanced software features.

Moreover UtilityCo users were asked to rate their SAP knowledge in the end-user survey. Twenty-three percent of classroom-trained users were not confident in using the system; while ninety-percent of non-classroom-trained users rated their knowledge as either poor or average. It is important to note that half of the non-classroom-trained users did not have any form of SAP training. By far the most frustrating aspect of UtilityCo users' interaction with SAP is navigating around the system (43%), followed by viewing fields on a screen (25%). Printing screens (17%), authorization issues (16%) workflow (13%) and approving/rejecting requests (12%) were other frustrations. Just over one-third of users (38%) indicated they would like to learn more about the application – particularly in the areas of navigation, reporting, leave applications, and purchase order processing.

Colleagues and workgroup support

The evidence suggests that colleagues are an important determinant of individual capacity to use an ERP system post go-live. ManuCo demonstrated that in the absence of formal SAP training and scant documentation, colleagues and/or workgroups were the principle source of SAP knowledge and skills. Existing employees, however, often did not have the time to embed new users with a deeper understanding of the system, therefore, training from colleagues in ManuCo was focussed on the steps necessary to complete the task at hand. Moreover, ManuCo found that when end-users required assistance, key-user availability was less than fifty-percent.

Armed with access to quality documentation, end-users still prefer to first ask a colleague for help when they encounter a problem. This is probably due to the ease of access to colleagues in the immediate work area, and the time savings in not having to navigate the documentation or call the help desk. UtilityCo, for example, found that about two-thirds of users (64%) first turned to a colleague for help when they encountered a problem. Only 15% of UtilityCo users accessed the Learning Centre first when they encountered a problem and a further 9% phoned an SAP specialist. There was no evidence in any of the three organisations regarding how the workgroup impacted on knowledge, skills and affective outcomes.

Incentives/disincentives

The evidence suggests that incentives are also an important determinant of individual capacity to use an ERP system post go-live. In UtilityCo the actions of any user can significantly impact on critical business processes, therefore, UtilityCo implemented mechanisms for promoting user competence. One such mechanism was the accreditation framework. All new users must complete an online SAP orientation before gaining access to SAP. Moreover, UtilityCo proposed reinvigorating a formal recognition program for SAP Network members as a

reward for their support. The recognition involved using “Nice One” awards to promote interest in appreciating the contribution that the SAP Network makes to its user communities. SAP Network members also received exclusive ‘hints and tips’ to share amongst the network. UniCo end-users, on the other hand, were not granted SAP access until they had undertaken SAP training.

Organisational-Capacity Model (Figure 2)

In this section, we now explore the extent to which each of the factors shown on the left of Figure 2 also contributed to Organisational capacity to use the ERP system effectively. First, findings from ManuCo demonstrate that staff turnover had a *negative* impact on many individuals’ capacity to use the ERP effectively. Due to staff turnover, two-thirds of the users had no formal SAP training and rated their knowledge accordingly. Second, having resources devoted to ongoing support was clearly an enabler of individual and organisational capacity to use the ERP system effectively – as evidenced by the contrast between UtilityCo and ManuCo. UtilityCo was proactive in maintaining and enhancing their training and support resources; ManuCo was not. Although their lengths of time since go-live differed markedly, only 38% of UtilityCo’s SAP users desired further assistance and training, whereas more than 80% of ManuCo users felt they were not adequately trained. Also, 68% of UtilityCo users were aware of the SAP Learning Centre, yet only 5% of ManuCo users were aware of documentation.

Third, after considering the evidence in the three reports, it is apparent that the organisational-capacity variable ‘quality’ of support services in Figure 2 is more complex than first anticipated due to interrelationships amongst the support services. UtilityCo found that the vast majority of users who had used the SAP Learning Centre found it easy to use (85%) and found it useful (88%). Nonetheless, only 15% of users first turned to the SAP Learning Centre for help when they required assistance, preferring to ask a colleague instead. Moreover, less than 10% of UtilityCo users contacted the help desk for support, although this could be due to the ease availability of colleagues, the SAP Learning Centre and the SAP Network. Finally, there was some evidence that the frequency and magnitude of ERP change causes a *decline* in both individual and organisational capacity to use. For example, UtilityCo undertook an extensive retraining effort to coincide with the system upgrade.

DISCUSSION

The findings from the three organisations’ end-user surveys provide some preliminary support for both the Individual-capacity model and the Organisational-capacity model. Nearly all of the independent variables in the Individual-capacity model were important in at least one organisation for improving individual’s capacity to use. The importance of workgroups in facilitating individuals’ knowledge, skills and attitudes was not discussed by any of the organisations analysed, however, there are some strong evidence in the literature that workgroups also play an important role (Jaspersen et al. 2005; George et al. 1995; Galletta 1995; Gash & Kossek 1990). In terms of the Organisational-capacity model, there was some evidence that the sum of individual capacities was the prime determinant of organisational capacity. Moreover, staff turnover and system changes had a negative impact on organisational capacity, while training and support mechanisms had a positive impact.

One key question that motivated this study is whether end-user knowledge and skills degrade over time in the absence of ongoing training and support. The evidence from ManuCo suggests it does. Further, the UtilityCo case shows that an organisation can simply maintain the current level of organisational-capacity if it invests in ongoing training and support. For example, at the inception of UtilityCo’s Learning and Development initiative, a survey identified about one-fifth of end-users had below average SAP skills and knowledge. One-year after this initiative, about one-fifth of trained users felt that their training needs were not being met. This suggests that despite UtilityCo’s concerted effort to upskill its user community, UtilityCo had simply maintained the status quo in terms of the total pool of competent and confident end-users. Possible reasons for failure to achieve higher than 80% claimed user competence are (a) a staff turnover rate of 15%¹ and (b) more ambitious knowledge targets set by existing users as they engage with the system and discover advanced functionalities not covered during initial training. These competing forces (as well as the learning needs that result from ERP system modifications) mean that at any given point in time, there will always be users at various stages of the ERP learning process. Therefore, when this total pool of users is analysed, there will be a significant proportion of end-users who are not fully competent or confident in using the system.

LIMITATIONS

The main limitation of this paper relates to the data collection method. The authors were not involved in the development, dissemination and analysis of UniCo and ManuCo’s surveys. At UtilityCo, the authors were not involved in survey development and dissemination, however, they were given the raw data from the end-user

¹ UtilityCo’s budgeted turnover of employees is 15% which includes staff changing roles.

survey and were able to independently replicate UtilityCo's analysis. An in-depth longitudinal study within additional organisations would provide more persuasive evidence; such research is currently being undertaken by the first author.

CONCLUSION

This paper's contribution to the literature is the model of factors affecting Organisational-capacity to use an ERP system effectively in the period after go-live, backed by evidence from preliminary tests that indicates support for much of the model. The model itself was presented in two parts. Part 1 focuses on factors that affect an individual's capacity to use the relevant part of the ERP system effectively (Figure 1). Part 2 looks at factors that affect an organisation's overall capacity to use the system effectively (Figure 2). The link between the two parts is that the usage-weighted sum of all individuals' capacity represents organisational capacity to use. At the organisational level, staff turnover through attrition, new hires, and staff changing roles has a negative impact on organisational capacity; likewise ERP system changes also has a negative impact. Positive influences on organisational capacity to use are the extent and quality of resources devoted to ongoing training and support. The fundamental logic underpinning the two parts of the model is that organisations that do not invest in ongoing training and support post go-live will likely experience a decline in end-users' knowledge, skills and attitudes towards the ERP. Investment in ongoing training and support, however, will not necessarily lead to an increase in organisational knowledge, skills and attitudes. This is due to the competing forces of staff turnover, system changes, and users' increasing desire to enhance their system feature use.

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